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CONTENTS:

Varieties of <i>Sisymbrium officinale</i> . <i>B. L. Robinson</i>	101
Two Ferns New to Vermont. <i>C. Gilman</i>	103
Parthenogenesis in <i>Antennaria</i> . <i>R. G. Leavitt & L. J. Spalding</i>	105
Plants of Oneida County, New York. <i>J. V. Haberer, M. D.</i>	106
<i>Silene conica</i> in New England. <i>E. W. Hervey</i>	110
Desmid Flora of New Hampshire. <i>J. A. Cushman</i>	111
<i>Scrophularia leporella</i> at Willoughby. <i>G. H. Tilton</i>	119
Illustrations and Studies of the Family <i>Orchidaceae</i>	119

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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

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No. 78

TWO VARIETIES OF *SISYMBRIUM OFFICINALE* IN AMERICA.

B. L. ROBINSON.

MR. J. C. PARLIN has recently sent to the Gray Herbarium some specimens of the hedge-mustard, *Sisymbrium officinale*, Scop., calling attention to a striking difference in their color and pubescence. Mr. Fernald and I have examined these plants, as well as the available literature regarding the species, and find that there are in America, as well as in the Old World, two markedly different forms of *Sisymbrium officinale*, which were clearly recognized by the eldest DeCandolle, although for the most part undistinguished by subsequent authors. These are:—

S. OFFICINALE, Scop. Rather copiously pubescent on stem and leaves; the inflorescence and pods even at full maturity subtomentulose: whole plant grayish or bluish green. — Fl. Carn. ed 2, ii. 26 (1772); DC. Syst. ii. 459 (where extensive early synonymy is given); Reichenb. Ic. Fl. Germ. ii. t. 72 (1838); Fournier, Fam. des Crucif. 83 (1865); Ett. & Pok. Phys. Pl. Aust. ix. t. 857 (1873); Sowerb. Eng. Bot. ed. 3, 143, t. 94 (1873); Rusby, Mem. Torr. Bot. Club, iii. pt. 3, p. 5 (1893); Rouy & Foucaud, Fl. de Fr. ii. 19 (1895). *Erysimum officinale*, L. Sp. Pl. ii. 660 (1753). *Brassica adpressa*, Parish, Zoe, i. 57 (1890); Robinson, Syn. Fl. i. pt. 1, 134 (1895); not Boiss. — Europe, common. In America as follows:— MAINE: waste ground, Brownville, 4 Aug. 1904, J. C. Parlin, no. 1756. CALIFORNIA: Chico, May, 1878, Mrs. J. Bidwell; Elk Grove near Sacramento, 1884, Rev. J. C. Nevin, no. 926; streets of San Bernardino, April, 1886, S. B. Parish, no. 1772; a common weed, Berkley, 24 June, 1892, J. W. Blankinship. BOLIVIA: Cochabamba, Bang, no.

888 (distributed under a manuscript varietal name which, happily, does not appear to have been published).

Var. *LEIOCARPUM*, DC. Sparingly pubescent with stiffish slightly retrorse hairs; the inflorescence nearly smooth; pods entirely glabrous or with a few scattered hairs: plant inclining to yellowish green.—Syst. ii. 460 (1821); Guss. Fl. Sic. ii. 188 (1843); Fournier, Fam. des Crucif. 85 (1865); Rouy & Foucaud, Fl. Fr. ii. 20 (1895). *S. leiocarpum*, Jord. Diag. 139 (1864). *S. officinale* of nearly all American authors. *Erysimum officinale*, Pursh, Fl. Bor. Am. ii. 436 (1814).—Very common in North America (the original specimen from South Carolina). In the Old World rather rare, reported as follows:—Teneriffe according to DC. l. c.; Sicily, according to Guss. l. c. (an occurrence further proved by Todaro's no. 829 from Palermo); here and there in various parts of France and Corsica, according to Rouy & Foucaud, l. c.

These two forms of *Sisymbrium officinale* furnish an interesting parallel with *Chrysanthemum Leucanthemum* and its variety *subpinatifidum*, described by Mr. Fernald (RHODORA, v. 181), and with *Lactuca Scariola* and its variety *integrata*, recently discussed by Mr. L. H. Dewey (RHODORA, vii. 9-12). In each instance the typical form of the species (by which I mean here only that form which was first characterized) is a plant widely distributed and abundant in the Old World, but rare, local, and probably of rather recent introduction in America, while the varieties, although relatively rare in the Old World have taken a firm hold in America and are now widely distributed on this continent as pernicious weeds.

It is evident that the typical form of *Sisymbrium officinale* in its American occurrence is as yet chiefly established in California, where the variety, so common in other parts of the United States, appears to be rather rare.

The variety *leiocarpum* is so readily distinguished that there will be a temptation on the part of many to consider it distinct, as did Jordan. But it has been impossible as yet to correlate with the difference of pubescence any other clear or constant distinction. There is, it is true, a general tendency in the smoother form to have more slender pods and a slightly longer style. These differences, however, are by no means constant and the other distinctions of leaf-contour, length of seed, etc., mentioned by Jordan, are quite as often reversed as true in the sense in which he applied them.

By way of summary it may be said that our common hedge-mustard, having smoothish inflorescence and essentially glabrous pods, should be called *Sisymbrium officinale*, var. *leiocarpum*, DC., while the typical hairy-podded form, hitherto chiefly European in its distribution, proves to have been some years established in California and has now been found in Maine. It is therefore likely to be found elsewhere in our country.

GRAY HERBARIUM.

TWO FERNS NEW TO THE FLORA OF VERMONT.

CLARABEL GILMAN.

THE western half of Vermont is known as the home of rare and beautiful ferns, which grow among the mountains and upon the limestone rocks; but the portion east of the Green Mountains is not to be scorned by the student who delights in large and fine plants of the commoner ferns, as well as in new specimens of the rarer species. It was my good fortune last summer to find in the woods and on the hillsides of the town of Chester, Vermont, many unusually fine plants of some of the larger ferns, such as *Nephrodium spinulosum* and its variety *intermedium*, *Nephrodium Noveboracense*, *Athyrium filix-fœmina* and *thelypteroides*, *Polystichum acrostichoides*, *Nephrodium marginale*, and *Struthiopteris Germanica*. *Woodsia Ilvensis*, *Asplenium ebenum* and *Trichomanes*, and *Adiantum pedatum* are also among the natives of this region. Some fine specimens of *Botrychium lanceolatum* were gathered in a moist hollow on a hillside. Of course the common ferns of meadow, swamp, and pasture are found in Chester, as in most parts of New England. In all, 25 species and 6 varieties were gathered. But the special finds of the season were two varieties, one of which, so far as I have been able to learn, has not been previously reported in Vermont, and the other not in New England.

The first of these is Mr. Gilbert's variety *fructuosum* of *Nephrodium spinulosum*. The plants were first found August 18th. They grew around the base of a rock on the edge of a fine maple grove, and at once attracted attention by their richness and luxuriance of growth

and the unusual size of the fronds. The heavily fruited frond which was taken for pressing, when carefully examined, revealed glandular indusia covering the fruit-dots, but was so thick and heavy with its crowded pinnae that it could not be considered the variety *intermedium*. On referring to Waters's *Ferns*, it was found to correspond in all essential points with the description of the variety *fructuosum*, the principal part of which I quote: "Closely related to it (*N. spinulosum dilatatum*) is one more variety that has rather large sori, with glandular indusia, that form two lines on the smaller pinnules or on the lobes of the larger ones. The fronds are tripinnate below, bipinnate above. The stipes, which are one-third to one-half the entire length, are clothed sparingly with pale-brown ovate scales. This has been called variety *fructuosum* on account of the numerous sori." Dr. Robinson has since compared the fern with the forms of *N. spinulosum* in the Gray Herbarium, and has verified my identification of it as var. *fructuosum*. Waters says: "So far it has been collected only in New York and Connecticut, but it may prove to be of much wider range."¹

Believing, then, that a careful search may bring it to light in other New England states, I think it worth the while to compare it more in detail with the type and the two more common varieties. It is distinguished from the type form of *N. spinulosum* by the greater length of the lower pinnae, the larger sori, and the glandular indusia. Moreover, while the pinnae are not set more closely upon the rachis, the greater length of the pinnules throughout nearly the whole frond causes the pinnae to overlap and produces the appearance of crowding.

Again, while the general outline of the frond is much like that of the variety *intermedium*, especially the unusually long and broad form of *intermedium* sometimes found, it is distinctly heavier and closer, and has thinner, paler brown scales on the stipe.

The new fern, however, is much more likely to be confused with the variety *dilatatum*, especially the forms of the latter with lengthened fronds. As in var. *dilatatum*, the pinnae are very broad and finely taper-pointed, and the lowest pair have the pinnules on the lower side considerably longer in proportion to those on the upper

¹ Since writing the above I have read in *The Plant World* for February, 1905, that this variety was collected by Dr. Waters at McCall's Ferry, Pennsylvania, during the Botanical Symposium held there last July.

side than in other forms of *N. spinulosum*, but the pinnae overlap more than in most, if not all, of the specimens of var. *dilatatum* that I have seen. Moreover, the glandular indusia and the very thin, pale brown scales are distinguishing marks.

The other new fern, which is, however, much easier to recognize, is *Botrychium obliquum*, var. *Oneidense*, which, according to Waters, has been found before only in central New York, in the Catskills, and near Washington. It was growing in damp woods, like the typical form, but attracted notice by its blunter, clumsier appearance. It has shorter segments with fewer lobes, which are strongly rounded at the ends. The lower pinnae have each three pairs of these lobes besides a larger terminal one. The lobes look entire unless closely examined, when they are seen to be very faintly toothed. Only one plant was found, and of this only the sterile portion.

JAMAICA PLAIN, MASSACHUSETTS.

PARTHENOGENESIS IN *ANTENNARIA*.

R. G. LEAVITT AND L. J. SPALDING.

WE have observed every necessary step in the formation of embryos directly from egg-cells without fertilization in *Antennaria fallax* and *A. neodioica*. The flowers were carefully netted at a young stage and thus until the fruit was ripe were protected from pollen which might be brought from allied species or by a rare chance from the almost unknown male plants of the same species, either by insects or by winds. Microtome sections showed normal embryo-sacs and egg-apparatus and subsequent steps in the development of the embryo and endosperm; but no pollen tubes and no spermatic nuclei were seen. Details with drawings will be published later. Two other species under test conditions have shown embryo-formation, namely *A. canadensis* and *A. Parlinii*. Inasmuch as two American and one European species of *Antennaria* have now been shown to be parthenogenetic, the last named two may be assumed to behave in the same way; but this will soon be a matter of careful determination by us.

THE AMES BOTANICAL LABORATORY,
NORTH EASTON, MASSACHUSETTS.

PLANTS OF ONEIDA COUNTY, NEW YORK, AND
VICINITY.—I.

J. V. HABERER, M. D.

(Continued from page 97.)

† *FESTUCA OVINA* L., which the same observer (l. c. 161) reports as occurring "sparingly on Wallface," was abundant on barren hills.

† *AGROSTIS NOVAE-ANGLIAE* Tuckm. Found on the rocky ridge, contesting the ground with King Devil. Bald Mountain, August, 1895 (determined by Scribner and Merrill), also reported there by Paine (l. c. 166).

† *RHYNCHOSPORA FUSCA* R. & S. Boggy margins of Otter, Round and White Lakes, Deer Pond beaver meadow. Paine reports it in the "North Woods." There are several stations for the plant in the towns of Wilmurt, Herkimer County; Morehouse and Arietta, Hamilton County.

† *RHYNCHOSPORA GLOMERATA* Vahl. The only locality mentioned by Paine (l. c. 150) is Bald Mountain. The plant is abundant throughout the White Lake region. Common along Moose River, Lyons Falls, Lewis Co., Sacandaga River, Northville, Fulton Co. (alt. 800 ft.), and the West Canada Creek at East Herkimer (alt. 410 ft.). At the latter locality it was found July 8 and 14, 1904, on the gravelly flats of the stream in company with **Juncus brevicaudatus* Fernald., *Juncus filiformis* L., *Deschampsia caespitosa* (L.) Beauv., *Andropogon furcatus* Muhl., **Physalis heterophylla nyctaginea* Rydb., *Lysimachia vulgaris*, L., **Limnorchis media* Rydb., *Spiranthes (Gyrostachys) plantaginea* Raf., *Spiranthes (Gyrostachys) gracilis* Bigel. (also at Deer Pond), and **Equisetum variegatum Nelsoni* A. A. Eaton. This station for the latter is I believe the only one known in the State (Fern Bull. xii. 41). Simulates forms of *E. litorale*.

* *SCIRPUS RUBROTINCTUS* Fernald. Common in beaver meadows. Abundant in many localities in the Mohawk Valley and Adirondacks. Greedily devoured by cattle.

SCIRPUS SUBTERMINALIS Torr. Abundant in rapid streams, the typical aquatic plant quite in contrast to the variety *terrestris* Paine, which grows on a quaking morass in Litchfield, Herkimer County. Paine's (l. c. 148) single locality (for the species) in the county,

North Pond, is about ten miles south of White Lake. It is common in the Adirondacks.

† *CAREX NOVÆ-ANGLIAE* Schw. In sandy soil on the border of a beaver meadow near the railroad station. (*Eriophorum alpinum* L., was found in the same meadow.) This Carex fairly carpets the ground in many sandy localities about North Lake, Atwell, N. Y. In the lamented Dr. Howe's admirable "New York species of Carex" (48 Rep. N. Y. Mus. Nat. Hist. 78), it is ascribed only to Rensselaer County, and in Paine (l. c. 155) to the Mt. Marcy region on the authority of Dewey and Knieskern. Reported from western New York.

* *CAREX MIRABILIS PERLONGA* Fernald. Frequent on the rocky ridge. Banks of Sacandaga river, Fulton Co. Rocks, north side of the Mohawk at Little Falls.

* *CAREX SCOPARIA CONDENSA* Fernald. Common on the rocky ridge. Slopes of Bald Mountain. Jefferson County, *Crawe*.

* *CAREX VESICARIA JEJUNA* Fernald. Shallow waters of Round Lake and Deer Pond. North Lake and vicinity. Sand Lake and Raquette Falls specimens are cited by Mr. Fernald, *RHODORA*, iii. 53.

† *SALIX CANDIDA* Fluegge. Beaver meadows at Deer Pond and near the railroad. These stations are fully fifty miles north of the cold elevated marshes of South Herkimer County where the plant is common. Also recorded there by Paine (l. c. 128).

* *CALLITRICHE HETEROPHYLLA* Ph. Plentiful in White Lake outlet and the confluent stream of the other lakes, Cuming's Creek. *C. verna* L., is the prevailing species in the Mohawk Valley.

† *PODOSTEMON CERATOPHYLLUM* Mx. Frequent on stones in the rapid waters of White Lake outlet. Hitherto known only in Jefferson County. (Record in Catalogue, 123.)

† *MYRIOPHYLLUM HETEROPHYLLUM* Mx.? Rather common in Long Lake, also a terrestrial form on low muddy shores. Irondequoit Bay, *Booth* in Catalogue, 81.

* *UTRICULARIA RESUPINATA* B. D. Greene. Single flowering specimen in mossy sloughs at Long Lake. "North Woods," *B. D. Gilbert*. The genus was well represented, *U. cornuta* Mx., † *U. minor* L., † *U. intermedia* Hayne and *U. vulgaris* L., were common in beaver meadows, the first mentioned in full bloom, in abundance, was like unto a field of low buttercups. These four species are

closely associated on Hidden Lake, Litchfield, Herkimer County. (Long Lake was probably a botanical paradise in its day, but the axe and forest fires have left it a barren waste.)

PONTEDERIA CORDATA L. A single plant of the pinkish-white flowered form at Long Lake, reminded us of a similar colony (known also to the late Father Wibbe), on the gravelly shores of Oneida Lake, South Bay, Madison County. Found in western New York by Mr. Geo. Miner. Bull. Torr. Cl. 1877.

* *ILEX VERTICILLATA CYCLOPHYLLA* Robinson., a well marked plant (little known and rarely collected), is abundant on the boggy margins of Otter Lake. A similar plant was found near Long and White Lakes.

* *VACCINUM PENNSYLVANICUM ANGUSTIFOLIUM* Gray. Common at Long Lake. Abundant on rocks, north side of the Mohawk at Little Falls. Adirondacks.

VIOLA LANCEOLATA L. Paine's (l. c. 62) single locality in the county is Clinton on the authority of Bradley. My first and only collection of this plant (fruiting specimens) was made at White Lake, where the plant is common on sandy and gravelly shores. Near Syracuse, *H. D. House* (Torreya, ii. 68).

* *SOLIDAGO MACROPHYLLA* Ph. Rocky ridge at White Lake. Cliffs, Trenton Falls. Common in the Adirondacks.

CORYDALIS GLAUCA Ph. This plant grows on the rocky ridge north of White Lake, also on Bald Mountain and at Little Falls *both* sides of the Mohawk. Reported also by Paine (l. c. 59) in the two latter localities. The rocks are identical.

* *LYCHNIS CHALCEDONICA* L. and † *PHLOX PANICULATA* L. An extraordinary growth of these plants was found on a densely wooded slope, perhaps survivals of an old logging camp.

* *HIERACIUM AURANTIACUM* L., and * *HIERACIUM PRAEALTUM* L., vile weeds throughout the region, as well as central New York, were unknown to American botany when the Catalogue was published.

* *ARCEUTHOBIA PUSILLUM* Peck. (*Razoumofskya pusilla* (Peck) Kuntze.) Over twenty years ago (Bull. Torr. Cl. ix. 33) I reported this plant as growing on *Picea Mariana* B. S. P. (*P. nigra* Link.), in the sphagnum marshes on the heights of Frankfort and Graefenberg (alt. 1300 ft.), Herkimer County, within two miles of the Oneida-Herkimer Co. line and five miles from Utica. Persistent search throughout Oneida County, at last revealed the dwarf mistletoe within

its borders, for it was found on July 24 last in abundance on black (stunted) spruce trees near Long Lake, Forestport! It was the crowning find of a very successful and enjoyable botanical trip.

Several species of *Amelanchier* were very abundant in the White Lake region and shad-berry pie was a *common* dessert at the Lake House.

I know of no better place to report the following plant, hitherto unknown in central New York.

CAREX ALBICANS Willd. (*C. Peckii* Howe.) Wooded banks of the West Canada Creek below Trenton Falls, on the east side of the stream; Russia, Herkimer County (alt. 650 ft.). Found June 13, 1904. Previously ascribed to Albany, Jefferson, Cayuga and Yates counties. Included in Catalog, 155, with notes by Knieskern and F. Boott, and cited at Penn Yan and Rochester by Dewey. I expect to find it in Oneida County.

* The following is a partial list of the plants found, that were unrecognized as species and varieties when the Catalog was published. Those printed in *italics* are known to the writer as occurring also in the Adirondacks, while those preceded by a dash occur southward. The others are of general distribution.

- Sparganium fluctuans* Robinson.
- *PANICUM UNCIPHYLLUM* Trin.
- DANTHONIA COMPRESSA* Aust.
- SCIRPUS PEDICELLATUS* Fernald.
- S. ATROCINCTUS BRACHYPODUS* Fernald.
- ERIOPHORUM TENELLUM* Nutt.
- *CAREX INTUMESCENS FERNALDII* Bailey.
- C. Baileyi* Britton.
- *C. DEBILIS STRICTIOR* Bailey.
- C. stellulata cephalantha* Fernald.
- C. stellulata excelsior* Fernald.
- C. stellulata angustata* Carey.
- *C. INTERIOR CAPILLACEA* Bailey.
- C. CANESCENS DISJUNCTA* Fernald.
- C. CANESCENS SUBLOLIACEA* Laest.
- C. Crawfordii* Fernald.
- C. tribuloides reducta* Bailey.
- C. BEBBII* Olney.
- *C. FOENEA PERPLEXA* Bailey.
- *JUNCUS TENUIS ANTHELATUS* Wieg.
- J. DUDLEYI* Wiegand.
- J. BREVICAUDATUS* Fernald.
- Nymphaea hybrida* Peck.
- Spiraea latifolia* Borkh.
- Rubus nigricans* Rydb.
- Amelanchier spicata* Dec.
- *HYPERICUM MACULATUM SUBPETIOLATUM* Bick.
- H. boreale* Bick.
- EPILOBIUM ADENOCaulon* Haussk.
- VACCINIUM OXYCOCCUS INTERMEDIUM* Gray.
- AZALEA CANESCENS* Michx.
- Gentiana rubricaulis* Schw.¹
- *LYCOPUS UNIFLORUS* Michx.
- GALIUM LABRADORICUM* Wiegand.

¹ Credited to Paine, Herkimer Co. by Gray, *Syn. Fl. ii. pt. 1, 123.*

The following is an additional list of plants that were included in the Catalog but with no definite record of their having been found in the County. The type and signs have the same signification as in the preceding list.

<i>Sporobolus serotinus</i> Gray.	BETULA PAPYRIFERA Marsh.
<i>SCIRPUS ATROCINCTUS</i> Fernald.	MYRICA GALE L.
<i>Carex Michauxiana</i> Boeckl.	SPIRAEA TOMENTOSA L.
<i>C. ROSTRATA</i> Stokes.	<i>Gentiana linearis</i> Froel.
— <i>C. lenticularis</i> Michx. (Trenton Falls.)	HYPERICUM ELLIPTICUM Hook.
<i>C. viridula</i> Michx.	GALIUM CLAYTONI Michx.
<i>Alnus mollis</i> Fernald (as <i>A. viridis</i>).	<i>Lobelia Dortmanna</i> L.

A long list of plants could be given that are more or less interesting to close observers of plant distribution. A few of them are *Pellaea gracilis* Hook., *Asplenium Trichomanes* L., *Sparganium angustifolium* Michx., *Scheuchzeria palustris* L., *Sagittaria graminea* Michx., *Carex pauciflora* Lightf., *C. oligosperma* Michx., *C. chordorrhiza* Ehrh., *Eriocaulon septangulare* With., *Juncus filiformis* L., *Juncus pelocarpus* E. Meyer., *Spiranthes gracilis* Big. (single plant), *Brasenia purpurea* Casp., *Dalibarda repens* L., *Epilobium lineare* Muhl., *Andromeda glaucophylla* Link., *Epigaea repens* L., *Kalmia angustifolia* L., *Linnaea borealis* Gronov. and *Limnanthemum lacunosum* Griseb.

A number of unsettled genera such as *Viola* and *Antennaria* can be better noted from other sections of the county. The orchids now number forty in Oneida County and forty-two species and varieties in Herkimer County. The writer is confident that further explorations in the White Lake region, at an earlier and later season will reveal additional plants, hitherto unknown in a county which is exceedingly luxuriant in its vegetation and has rather Canadian than Alleghanian flora.

UTICA, N. Y.

SILENE CONICA IN NEW ENGLAND.—Several specimens of *Silene conica*, L., were found by me, June, 1904, in Dartmouth, Massachusetts, in a field newly laid down to grass. A considerable quantity of French clover, *Trifolium incarnatum*, Willd., was also noticed in the same field.—E. WILLIAMS HERVEY, New Bedford, Massachusetts.

A CONTRIBUTION TO THE DESMID FLORA OF NEW HAMPSHIRE.

JOSEPH A. CUSHMAN.

(Plate 61.)

ALTHOUGH New Hampshire contains the greater part of what may be called the mountain region of New England, with the highest elevations of land and great numbers of ponds and lakes, its Desmid flora has hardly been touched on. By the natural conditions of alpine summits and valley lakes a considerable number of species would naturally be expected. In the present paper it is believed that all previous records are included. These records are as follows: a few species collected by Lewis at Saco Lake and reported in Wood's Fresh Water Algae of the United States; a short list of about a dozen species from Hanover recorded by Edwards in the Geology of New Hampshire; a very few records in Wolle's Desmids of the United States; a few records from about Rochester by Hastings; a few records by L. N. Johnson; a number of records and descriptions of new species by W. & G. S. West, these being largely from the notes of L. N. Johnson.

During the last three years the writer has obtained a considerable amount of New Hampshire material. This consists of the following: very rich collections from Pudding Pond, North Conway and from Intervale, consisting of *Utricularia* and an abundance of Desmids, collected by Dr. Glover M. Allen; collections from North Woodstock and Mt. Moosilauke (3000 and 4000 ft. altitude) collected by Warren A. Priest; several lots of material from about North Woodstock, collected by George A. Fisher; material from Squam Lake, collected by Herman Gammons; and lastly material from Noone's Station, obtained from dried *Utricularia* specimens in the Gray Herbarium collected by Dr. B. L. Robinson (no. 473).

The material of L. N. Johnson, which was reported by slide numbers and which is now in the Cryptogamic Herbarium of Harvard University, has been examined by the writer through the kindness of Drs. Farlow and Thaxter. Those which were located are marked with an exclamation point (!) as well as all the other records for which specimens were seen by the writer.

As the material from North Conway and Intervale was taken from ponds, which are in direct water connection with that from which Wood's specimens were obtained, it is not surprising to find nearly if not all of his recorded species appearing from these two localities.

Nearly all of Prof. Bailey's species have also turned up in this material. As access has been had to his original notes and drawings, certain critical notes are appended to those species, as the published figures were as a rule poor, while the originals were careful camera drawings.

Certain of the names and genera used by Wolle in his Desmids of the United States need revision and for the species touched upon this has been roughly indicated. In the arrangement of the genera the writer has followed that given in W. & G. S. West's British Desmidiaceæ with slight differences, these last conforming more closely with Wille's classification in Engler and Prantl. My thanks are due to Dr. O. Borge of Stockholm, Sweden, for helpful suggestions especially as to certain of the forms here published as new. Species new to the New England list are preceded by an asterisk.

The abbreviations H. J. and H. C. indicate that the specimens are preserved in the herbarium of L. N. Johnson and of the writer respectively.

GONATOZYGON DeBary.

G. MONOTAENIUM DeBary. (*G. asperum*, Wolle '92: *G. Ralfsii* DeBary.) Length 260 μ : breadth 11 μ . Pudding Pond, North Conway, rare! Holderness, scarce (*Wests*).

G. BREBISSONII DeBary. (*G. Ralfsii*, Johnson '95). Length 136-160 μ : breadth 6-8 μ . Laconia (*Wests*).

G. ACULEATUM Hastings. Breadth with spines 40 μ , without spines 20 μ . Pennichuck Pond, Nashua (*Hastings*). Laconia, frequent (*Wests*). Meredith, occasional (*Johnson*).

SPIROTAENIA Bréb.

S. CONDENSATA Bréb. Length 122 μ : breadth 18 μ . Pudding Pond, North Conway, frequent!

MESOTAENIUM Näg.

M. MACROCOCCUM (Kütz.) Roy & Biss. (*M. Braunii*, Wolle '92). Reported from the Flume (*F. S. Collins*).

M. ENDLICHERIANUM Näg. Length 25 μ : breadth 8 μ . Intervale, frequent!

CYLINDROCYSTIS Menegh.

C. BREBISSONII Menegh. (*Penium Brebissonii*, Wolle '92). * Var. MINOR W. & G. S. West. New to U. S. (Herbarium of Jos. A. Cushman, no. 112.) Length 28 μ : breadth 13 μ . Intervale, frequent!

C. CRASSA DeBary. (*Penium crassa*, Wolle '92.) Length 40 μ : breadth 20 μ . Mt. Moosilauke, abundant!

C. DIPLOSPORA Lund. (*Calocylindrus diplospora*, Wolle '92.) Length 48-61 μ : breadth 27-32 μ : isthmus 23-28 μ . Intervale, frequent!

*C. AMERICANUM W. & G. S. West. Var. minor var. nov. While specimens from Colorado agreed almost exactly with the types from New York, these specimens from New Hampshire and those from Newfoundland were considerably smaller and the variation seems to be constant. Length 34-40 μ : breadth 16-18 μ . Mt. Moosilauke! (H. C. no. 80.)

NETRIUM Näg.

N. DIGITUS (Ehrenb.) Itzigs. & Rothe. (*Penium Digitus* and *Penium lamellosum*, Wolle '92.) Length 200-280 μ : breadth 62-78 μ . Pudding Pond, North Conway! Intervale! Mt. Moosilauke, abundant! Saco Lake (*Wood*).

N. OBLONGUM (DeBary) Lütkem. (*Penium oblongum*, Wolle '92.) Length 96 μ : breadth 29 μ . Intervale!

* Var. CYLINDRICUM W. & G. S. West. New to U. S. (H. C. no. 78.) Length 60-71 μ : breadth 18-20 μ . Mt. Moosilauke, abundant!

* Forma major (Turner) forma nov. Length 168 μ : breadth 44 μ . Pudding Pond, North Conway, frequent!

N. INTERRUPTUM (Bréb.) Lütkem. (*Penium interruptum*, Wolle '92.) Length 172-320 μ : breadth 38-40 μ . Intervale, scarce!

PENIUM Bréb.

P. LIBELLULA (Focke) Nordst. (*P. closterioides*, Wolle '92.) Length 233-320 μ : breadth 38-50 μ . Intervale, scarce! Pudding Pond, North Conway, common! North Woodstock, common!

* Var. *INTERRUPTUM* W. & G. S. West. New to U. S. (H. C. no. 116.) Length 120μ : breadth 22μ . Pudding Pond, North Conway!

P. *MARGARITACEUM* (Ehrenb.) Bréb. Length 150μ : breadth 22μ . Intervale! Pudding Pond, North Conway! Plymouth (*West*s). Their specimens did not show the linear arrangement of the markings.

P. *POLYMORPHUM* Perty. Length 50μ : breadth 20μ . Pudding Pond, North Conway, occasional!

P. *MINUTUM* (Ralfs) Cleve. (*Docidium minutum*, *Penium minutum*, *Calocylindrus minutum*, Wolle '92.)

* VAR. *ELONGATUM* W. & G. S. West. Length 372μ : breadth 9μ : Variety new to United States. (H. C. no. 115.) Pudding Pond, North Conway!

ROYA W. & G. S. West.

R. *OBTUSA* (Bréb.) W. & G. S. West. (*Closterium obtusum*, Wolle '92.) Length 150μ : breadth 15μ . Pudding Pond, North Conway!

CLOSTERIUM Nitzsch.

* C. *CYNTHIA* DeNot. Length 140μ : breadth 15.5μ . North Woodstock!

C. *DIDYMOLOCUM* Corda. Length $400-403 \mu$: breadth $25-34 \mu$: apices 13μ . Intervale, common! Mt. Moosilauke!

C. *MACILENTUM* Bréb. Length 527μ : breadth 15.5μ : apices 6μ . Intervale!

* Forma *INTERMEDIUM* Racib. Form new to U. S. (H. C. no. 114.) Length 200μ : breadth 8.5μ : apices 5μ . Pudding Pond, North Conway!

C. *ANGUSTATUM* Kütz. Var. *CLAVATUM* Hastings. Length 650μ : breadth 28μ : apices 16μ . North Woodstock! Rochester (*Hastings*). Saco Pond (*Wood*). Hanover (*Edwards*).

C. *COSTATUM* Corda. Length $340-410 \mu$: breadth $38-44 \mu$. Pudding Pond, North Conway!

* Var. *Westii* var. nov. (*C. costatum*, forma: W. & G. S. West: Trans. Linn. Soc. Lond. (Bot.) v. 237. t. XIII, f. 23, 24). Length $230-300 \mu$: breadth $25-32 \mu$: apices $10-12 \mu$. Cells only slightly

curved, tumid in the middle, apices truncate: membrane punctate between the striae: smaller than the typical form of the species. North Woodstock! (H. C. no. 189.)

*C. REGULARE Bréb. Length $250\ \mu$: breadth $37\ \mu$: apices $8\ \mu$. New to U. S. (H. C. no. 107.) Intervale!

C. STRIOLATUM Ehrenb. Length $332\ \mu$: breadth $37\ \mu$: apices $12.4\ \mu$. Saco Pond (*Wood*). Meredith (*Wests*). Plymouth (*Wests*) (H. J. no. 382)!

VAR. INTERMEDIUM (Ralfs) Jacobs. Length $245\ \mu$: breadth $34\ \mu$. Intervale!

*VAR. ELONGATUM Rab. Length $400\ \mu$: breadth, $25\ \mu$. Intervale!

*VAR. ERECTUM Klebs. Length $360\ \mu$: breadth $34\ \mu$. (H. C. no. 187.) North Woodstock!

***Closterium intervalicola** sp. nov. (PLATE 61, FIG. 1.) Length $168\ \mu$: breadth $15.5\ \mu$: apices $6\ \mu$. Small Closterium with the median portion nearly straight, but with the ends decidedly curved: apices squarely truncated: about six visible striae: cell wall of a light yellowish color in empty cells. Intervale! (H. C. no. 104.)

C. JUNCIDUM Ralfs. Length 320 – $375\ \mu$: breadth 6 – $8.5\ \mu$: apices $3.5\ \mu$. Pudding Pond, North Conway! Saco Lake (*Wood*).

C. DIANAE Ehrenb. Length $325\ \mu$: breadth $25\ \mu$. Pudding Pond, North Conway!

C. PARVULUM Nág. Length 108 – $170\ \mu$: breadth 10 – $13\ \mu$: apices 1.5 – $2.5\ \mu$. Pudding Pond, North Conway!

*C. INCURVUM Bréb. Length $68\ \mu$: breadth $12\ \mu$. New to U. S. (H. C. no. 101.) Intervale!

C. VENUS Kütz. Length 72 – $75\ \mu$: breadth 9 – $10\ \mu$. Bog near Noone's Station! Mt. Moosilauke, common!

*C. CALOSPORUM Wittr. Length $108\ \mu$: breadth $10\ \mu$. Pudding Pond, North Conway!

C. ACUMINATUM Kütz. Length 325 – $360\ \mu$: breadth 25 – $31\ \mu$. Pudding Pond, North Conway!

C. MONILIFERUM (Bory.) Ehrenb. Length $265\ \mu$: breadth $40\ \mu$. Intervale!

C. EHRENBERGII Menegh. (C. robustum Hastings.) Length 400 – $480\ \mu$: breadth 100 – $120\ \mu$. Page Brook, Rochester (*Hastings*).

C. ACEROSUM (Schrank.) Ehrenb. Length $450\ \mu$: breadth $38\ \mu$. Intervale!

C. LUNULA (Müll.) Nitzsch. Length 510-530 μ : breadth 71-90 μ . North Woodstock! Pudding Pond, North Conway, common!

* *Forma MINOR* W. & G. S. West. Length 403 μ : breadth 56 μ . Intervale!

C. JOHNSONII W. & G. S. West. Length 357 μ : breadth 12 μ : apices 12 μ . Plymouth (H. J. no. 655)! On examining the type of this species its closeness to *C. didymotocum* was at once noticed. The sigmoid character of the specimen may be due to the mounting of it as but one semicell seems to give this character. The apices have the dark brown annular thickening characteristic of *C. didymotocum*. It is however somewhat more attenuated than the ordinary forms of that species.

C. TUMIDUM Johnson. Length 130-150 μ : breadth 15-18 μ . Pudding Pond, North Conway! Holderness, frequent (Johnson).

C. ATTENUATUM Ehrenb. Length 465 μ : breadth 45 μ . Pudding Pond, North Conway!

C. TURGIDUM Ehrenb. * *Forma intermedium* forma nov. Length 400 μ : breadth 28 μ : apices 7-9 μ . Smaller by one half or one third than the typical form. Intervale! (H. C. no. 110).

C. BRAUNII Reinsch. (*C. maculatum* Hastings. *C. areolatum* Wood.) Breadth 25-30 μ . Rochester (Hastings).

C. PRONUM Bréb. Length 320-375 μ : breadth 6-8.5 μ . Pudding Pond, North Conway!

C. LINEATUM Ehrenb. var. *COSTATUM* Wolle. Rochester (Wolle).

C. RALFSII Bréb. var. *HYBRIDUM* Rab. Length 540-575 μ : breadth 40-63 μ : apices 10.5-11 μ . Pudding Pond, North Conway! Moore's Station!

C. DECORUM Bréb. Length 510-540 μ : breadth 25-48 μ : apices 6-9 μ . Pudding Pond, North Conway! North Woodstock!

C. KUETZINGII Bréb. Length 420-450 μ : breadth 22 μ : apices 3 μ . Pudding Pond, North Conway!

C. SETACEUM Ehrenb. Length 400-465 μ : breadth, 10 μ : apices 1-2 μ . Pudding Pond, North Conway!

DOCIDIUM (Bréb.) Lund.

* *D. UNDULATUM* Bail. (*D. dilatatum*, Wolle '92.)

* *Forma PERUNDULATUM* W. & G. S. West (PLATE 61, FIGS. 2, 3). Length 223-330 μ : breadth at base 12-12.5 μ : at apices 12.5-13 μ .

Intervale! Pudding Pond, North Conway! There are no plications at the apices in these specimens nor in the series which have been seen from Florida and Cuba. In looking up Bailey's original drawings, several of this species were found. But one of these had the plicated apices. This was evidently an unfortunate publication of this figure as the type figure, as it did not truly represent the species. Wolle's figure of *D. dilatum* represents a typical *D. undulatum*.

PLEUROTAENIUM Näg.

P. CORONATUM (Bréb.) Rab. (*Docidium coronatum*, Wolle '92.) Length 480-580 μ : breadth at base 56-63 μ : apices 34-40 μ . Pudding Pond, North Conway! Noone's Station!

* Var. *FLUCTUATUM* West. Length 900 μ : breadth at base 65 μ : at apex 46 μ . Variety new to U. S. (H. C. no. 105.) Intervale!

* *P. subgeorgicum* sp. nov. (PLATE 61, FIG. 4). *Pleurotaenium* of much the same type as *P. Georgicum* Lagerh. but one third smaller, a crown of ten bluntly rounded spines at the apex, four or five undulations at the basal portion, ends of the semi-cell much narrower than the middle. Length 651 μ ; breadth at base 31 μ ; at middle of semicell 50 μ ; at apex 28 μ . North Woodstock! (H. C. no. 188.)

P. EHRENCBERGII (Bréb.) DeBary.

* Var. *ELONGATUM* West. Var. new to U. S. (H. C. no. 113.) Length 573 μ : breadth 25 μ : apices 19 μ . Pudding Pond, North Conway! This seems to be close to *P. excelsum* (Turner).

* Var. *UNDULATUM* Schaarschm. Var. new to U. S. (H. C. no. 101.) Length 496 μ : breadth 22 μ : apices 15 μ . Pudding Pond, North Conway!

P. TRABECULA (Ehrenb.) Näg. Length 496 μ : breadth 25 μ : apices 25 μ . Noone's Station!

* Forma *GRANULATA* G. S. West. Length 505 μ : breadth 34 μ : apices 28 μ . Form new to U. S. (H. C. No. 76.) Mt. Moosilauke!

Var. *RECTUM* (Delp.) W. & G. S. West. (*Docidium rectum*, Wolle, '92.) Length 250 μ : breadth at base 19 μ : apices 15 μ . North Woodstock!

P. CONSTRICTUM (Bail.) Wood. (*Docidium constrictum*, Wolle, '92.) (PLATE 61, FIG. 5.) Length 560 μ : breadth at isthmus 23 μ : maxi-

num breadth 44μ : apices 32μ . End with eight large bluntly pointed teeth, base with a suggestion of nodes. Pudding Pond, North Conway, frequent! Laconia, scarce (Wests).

P. verrucosum (Bail.) Lund. (*P. tessellatum* (Josh.) Lagerh., *P. trochiscum* W. & G. S. West.) Length, 420μ : breadth at base 28μ : at apex 22μ . End with six or eight teeth. From a study of Bailey's original notes it seems safe to place both of the above species as synonyms of *P. verrucosum*. Pudding Pond, North Conway, frequent!

P. nodosum (Bail.) Lund. Length 290μ : breadth at isthmus 27μ : maximum breadth 50μ : apices 34μ . Intervale, abundant! Pudding Pond, North Conway! Noone's Station! Laconia, not common (Wests) (H. J. no. 480).

TRIPLOCERAS Bail.

T. gracile Bail. Length 490μ : breadth at base 25μ : at apex 24μ . Pudding Pond, North Conway, frequent! Saco Lake (*Wood*). Laconia, common (Wests) (H. J. no. 649).

* Var. *montana* var. nov. (PLATE 61, FIG. 6.)

Variety with the apices with two simple processes, the base but six-radiate, whole form slender, apex considerably wider than the rest of the semi-cell. Length 360μ : breadth at base 16μ : apex 22μ . Intervale! (H. C. no. 162.)

T. verticillatum Bail. (PLATE 61, FIG. 7.) Length 505μ : breadth $40-47 \mu$: apices with processes 53μ . Intervale! Pudding Pond, North Conway! Saco Lake (*Wood*). Laconia (*Wests*) (H. J. no. 649)! This was in all cases seen the form with two bidentate processes at the end.

Var. *turgidum* Wolle. Rochester (*Wolle*).

TETMEMORUS Ralfs.

T. brebissonii (Menegh.) Ralfs. Length 189μ : breadth 34μ . North Woodstock!

T. granulatus (Bréb.) Ralfs. Length $178-236 \mu$: breadth $36-42 \mu$: isthmus 29μ . North Woodstock! Intervale! Pudding Pond, North Conway! Noone's Station!

EXPLANATION OF PLATE 61.

Figure 3, $\times 660$; all others, $\times 460$.

Figure 1. *Closterium Intervalicola* sp. nov.
 " 2, 3. *Docidium undulatum* Bail., forma *perundulatum* W. & G. S. West.
 " 4. *Pleurotaenium subgeorgicum* sp. nov.
 " 5. *Pleurotaenium constrictum* (Bail.) Wood.
 " 6. *Troploceras gracile* Bail., var. *montana* var. nov.
 " 7. *Pleurotaenium verticillatum* Bail.

(To be continued.)

SCROPHULARIA LEPORELLA AT WILLOUGHBY.—While visiting the Willoughby region last August the writer made an exploring trip on the West side of the lake in company with Mr. A. B. Emerson of Barton. We first examined an unreported sphagnum swamp near the lake, known as "Beaver Meadow." Numerous Heaths and Orchids were growing here in considerable quantity, some of which are marked uncommon in the listed flora of the region. This meadow deserves a more careful investigation by botanists. Emerging from the swamp in the direction of the Barton road, and crossing an upland pasture, we came upon a colony of *Scrophularia leporella*, Bickn. The plants were growing vigorously in springy soil and close beside a large boulder. Though late in August several of the thyrses were in full bloom. The writer recognized the genus and giving a specimen to Judge Churchill, he pronounced it *S. leporella*, Bickn. The plant is not in Dr. Kennedy's list of the Willoughby Flora, nor does it seem to have been previously reported from this part of the state.—Geo. H. Tilton, Woburn, Massachusetts.

ILLUSTRATIONS AND STUDIES OF THE FAMILY ORCHIDACEAE,¹ by Oakes Ames, A. M.—Mr. Ames's volume on the orchids is a notable contribution to the knowledge of this vast and difficult group of plants. The work not only shows great care in investigation, but in all details of presentation it is a model of clearness and accuracy. The present volume, which we are glad to learn is the forerunner of a series, deals with subject matter which may be grouped under four heads. In the first part about a score of tropical species, belonging to the genera *Acoridium*, *Cestichis*, *Campylocentrum*, *Ionopsis*, *Coral-*

¹ Fascicle 1; imperial 8vo., 156 pp., 16 pl. Houghton, Mifflin & Co., 8 Apr 1905.

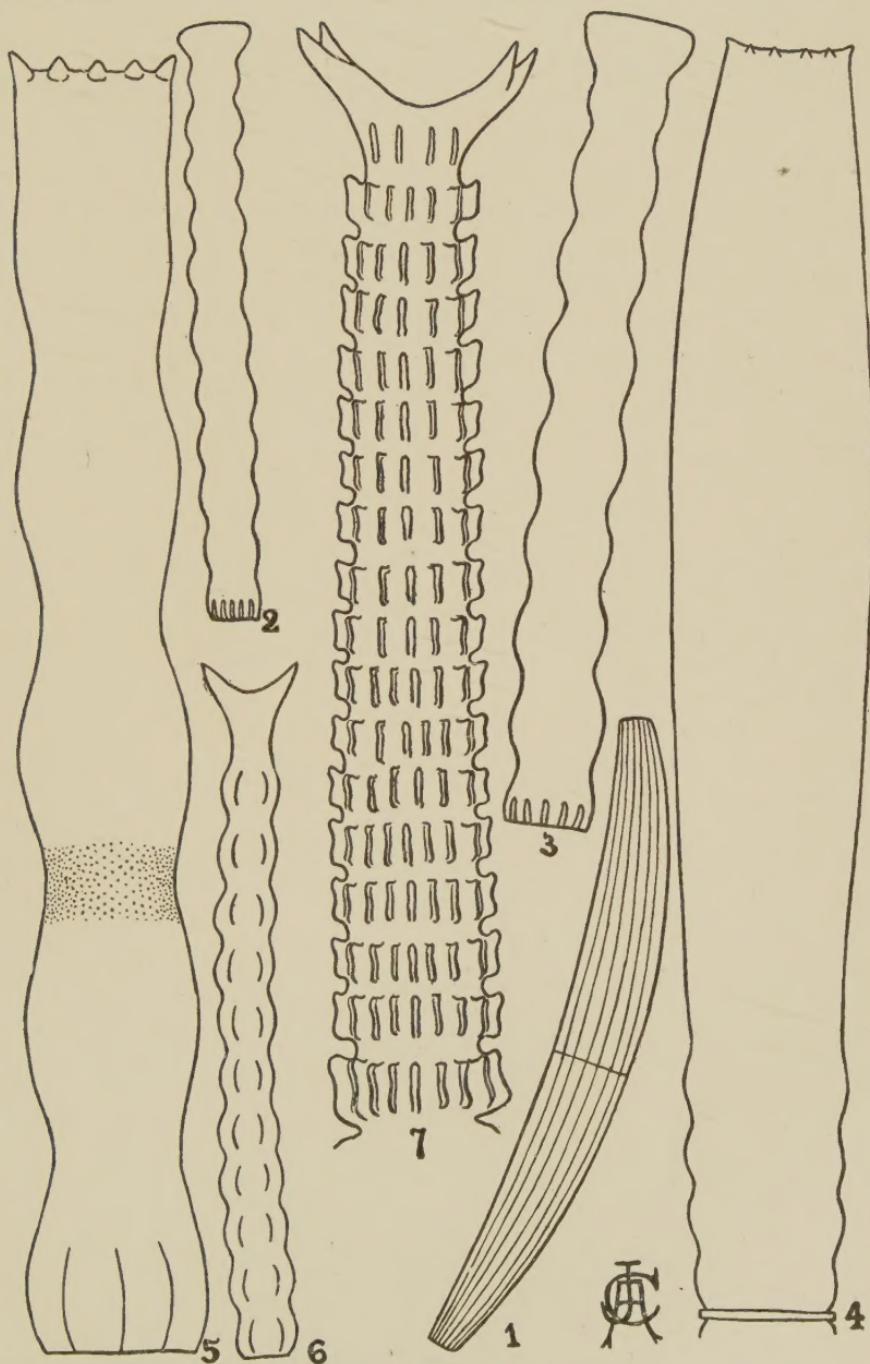
lorrhiza, *Epidendrum*, *Dendrobium*, *Sauroglossum*, *Liparis*, *Habenaria*, *Cyrtopodium* and *Dendrophylax*, are critically characterized and illustrated. Of these, several from the Philippine Islands are new to science. The second portion is devoted to a systematic and descriptive presentation of the Philippine orchids so far as they have been collected by the botanists of the United States government. About thirty genera and numerous species are here discussed. There follows a description of *Epidendrum variegatum*, Sw., an epiphytic West Indian orchid, recently discovered for the first time in the United States at Palm Beach, Florida, by Mr. Frank Idner. The fourth part, which will be of the greatest interest and assistance to North American botanists, is a revision of the difficult and much confused North American species of *Spiranthes*. In the preparation of this monographic treatment Mr. Ames has examined a well nigh incredible amount of material, and some idea of the detail of the work may be conveyed by the fact that the mere citation of specimens of *Spiranthes cernua* occupies seven closely printed pages. This unprecedented thoroughness in the citation of material examined might seem wasteful of space were it not proved by experience that no feature of a plant monograph is of more practical value to the working botanist.

It is impossible here even to mention, much less to discuss, the numerous points of interest brought out by Mr. Ames in relation to the identity and synonymy of the species discussed.

The plates and text-figures drawn by Mrs. Ames form an attractive and valuable feature of the work, combining to an unusual degree artistic merit and scientific accuracy. Reproduced by the Boston Heliotype Company, the plates show the distinctness of outline and softness of shading characteristic of its superior work.

A note in the preface intimates that future fascicles are likely to present contributions not merely to the taxonomy but to the morphology, physiology, and ecology of the *Orchidaceae*.

Vol. 7, no. 77, including pages 81 to 100, was issued 12 May, 1905.



J. A. Cushman del.

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